

Overview of experiments with RAG in EconBiz (ZBW)

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DEMO

The following slides include a number of screenshots since most presented tools only run on the development machine at the moment.

AI Services Dashboard

Experimental approaches using vector databases, LLMs and more

Chat with document(s)

RAG application based on single or multiple documents

Embedding: nomic-embed-text, avr/sfr-embedding-mistral

LLM: Mistral:7B-Instruct, llama3.1 8B

Vector DB: Chroma

Chatbot about FAQs

RAG app based on ZBW/EconBiz FAQs

Embedding: nomic-embed-text

LLM: various

Vector DB: Chroma

EconBiz enhanced search

RAG application - searching in EconBiz subset of 275,000 records.

Embedding: nomic-embed-text

LLM: Mistral:7B-Instruct, llama3.1 8B,

Vector DB: Qdrant

Chat with Documents

Home

Chat with document(s)

Drag and drop a document here or click to upload

Enter your question:

Provide a summary of the document with 300 words

Ask

Summary

Findings

Keywords

Datasets

Response:

Response:

Title: Automation, Productivity, and Inequality: An Analysis of Technological Changes from 1980 to 2016

The document presents an analysis of the impact of automation technologies on wages, productivity, and inequality, as studied by Acemoglu and Restrepo (2022). The research is supported by various foundations, including the Hewlett Foundation, Smith Richardson Foundations, Bradley Foundation, and National Science Foundation.

The study employs reduced-form approaches that can be estimated structurally. It investigates the evolution of wages and supplies between 1980 and 2016 across 500 demographic groups, with marker sizes proportional to hours worked in 1980 and colors indicating education levels.

The authors propose Proposition 6, which suggests that the implications of new automation technologies associated with displacement effects and cost savings ($dln \Gamma_{auto,g}$, $\tau_{auto,g}$) for each group g are given by the equation $dln w = \Theta * \text{stack}(dln \Gamma_{auto,g})$. The labor share changes for this and other technologies are provided in the Appendix to save space in the text.

To clarify, the authors refer to narrow labor-augmenting technological change as "productivity deepening" to emphasize that it enhances the comparative advantage of each group for tasks they already perform (those in the set T_g). The exact equations for labor share changes for various technologies are given in the Appendix.

In summary, this study examines the effects of automation on wages, productivity, and inequality across different demographic groups from 1980 to 2016. It proposes that new automation technologies have specific implications for each group, as represented by the equations provided in Proposition

Chat with document(s)

Drag and drop a document here or click to upload

Enter your question:

Provide the main finding from this document

Ask

Summary

Findings

Keywords

Datasets

Response:

Response:

The main finding from this document, as suggested by the keywords and JEL Classification, appears to revolve around the impact of automation, productivity, technology, and related factors on wages, inequality, and labor demand. However, the specific findings are not explicitly stated in the provided context. Instead, it mentions that Section 8 develops an approach for estimating the full general equilibrium effects of technologies within a certain framework, and this approach is implemented. Additionally, there are robustness checks conducted on the reduced-form analysis presented in the main text. To obtain the exact findings, one would need to read the complete document or refer to Tables 1, 2, A1, A2, and A3 for empirical results.

Sources: ['uploads/Blueprint-Discussion-Paper-2024.08-Acemoglu-Kong-Restrepo.pdf:9:3', 'uploads/Blueprint-Discussion-Paper-2024.08-Acemoglu-Kong-Restrepo.pdf:74:3', 'uploads/Blueprint-Discussion-Paper-2024.08-Acemoglu-Kong-Restrepo.pdf:1:2', 'uploads/Blueprint-Discussion-Paper-2024.08-Acemoglu-Kong-Restrepo.pdf:0:0', 'uploads/Blueprint-Discussion-Paper-2024.08-Acemoglu-Kong-Restrepo.pdf:120:0']

Blueprint-Discussion-Paper-2024.08-Acemoglu-Kong-Restrepo.pdf

Delete

ZBW/EconBiz FAQ

Chatbot Use Case | RAG App

Based on ZBW/EconBiz FAQ

Your question:

Why some articles at [Econbiz](#) are not accessible outside ZBW

LLM model:

Ask

A63: Some articles at EconBiz may not be accessible outside the ZBW because they are licensed online materials that require a ZBW account to access.

Note: Answers may contain inaccuracies. Consider rewording questions to cross-check the information.

Vesion:1

Chatbot Use Case | RAG App

Based on ZBW/EconBiz FAQ

Your question:

I would like to study at ZBW Kiel on Thursday from 7pm to 9pm, is that possible?

LLM model:

Ask

A63: The reading room on the 2nd floor at the ZBW Kiel is open from Monday, Tuesday, Wednesday, Friday, 10am - 2pm and Thursday 10am - 4pm. However, it does not seem to be suitable for your study needs as it is only open until 4pm on Thursdays. The reading room may not be available for individual study after 4pm on Thursdays. I would recommend checking the ZBW Kiel's website or contacting them directly for more information about studying at their facility outside of regular hours.

Note: Answers may contain inaccuracies. Consider rewording questions to cross-check the information.

ZBW/EconBiz FAQ interface

Conversation History

You:

Can I print at ZBW Hamburg

AI BOT:

Yes, you can print documents at the ZBW Hamburg. Send your print job to the printer (charges apply) and print it with your ZBW-card. The printer is located on the 1st floor.

You:

Does this apply to entire books?

AI BOT:

No, you can only print individual documents or articles from electronic journals and databases that are licensed by the ZBW at the ZBW Hamburg. Printing entire books is not possible.

You:

Can I do the printing myself or do I need someone to help me?

AI BOT:

You can do the printing yourself. The printer is located on the 1st floor, and you will need your ZBW-card to print the documents.

Message

How can I make the payment?

Ask

New Chat

Vesion:2

EconBiz enhanced search

Home



What is the economic effect of COVID-19 on women workers?

Search

Ask a question, such as:

The impact of inflation in everyday life in Germany?

The inflation in Germany and the impact of the war in Ukraine on it?

What is the economic effect of COVID-19 on women workers?

According to the sources, the economic effects of COVID-19 on women workers are as follows: * Women self-employed in Germany are 35% more likely to experience income losses than their male counterparts (Source: [10012432749](#) and [10012608675](#)). * Women are about one-third more likely to experience income losses than men among the self-employed (Source: [10012608675](#), corrected from 35%). * Women are 24% more likely to permanently lose their job than men due to the outbreak (Source: [10012322623](#)). * Women expect their labor income to fall by 50% more than men do (Source: [10012322623](#)). These findings suggest that women workers, particularly those who are self-employed, face significant economic challenges during the COVID-19 pandemic.

Econbiz ID: [10012202735](#)

Title: The Short-Term Economic Consequences of COVID-19: Exposure to Disease, Remote Work and Government Response

Authors: Béland, Louis-Philippe; Brodeur, Abel; Wright, Taylor

Year: 2020

Score: 0.7251592

Econbiz ID: [10012207840](#)

Title: The Short-Term Economic Consequences of COVID-19: Exposure to Disease, Remote Work and Government Response

Authors: Béland, Louis-Philippe; Brodeur, Abel; Wright, Taylor

Year: 2020

Score: 0.723312

Econbiz ID: [10012432749](#)

Title: COVID-19: a crisis of the female self-employed

Authors: Graeber, Daniel; Kritikos, Alexander S.; Seebauer, Johannes

Year: 2021

Score: 0.72205037

Challenges

The context!

- semantically similar but irrelevant results
- ranking for *quality, recency, or user preferences*

In addition:

The evaluation was conducted using manually selected publications, LLMs, and specified timeframes

The screenshot shows a search interface with the query "What is the economic effect of COVID-19 on women workers". A slider indicates the publication years from 1500 to 2024. A dropdown menu for "Choose an LLM model:" lists several models, with "Llama3.1 [8B]" selected. The main content area displays a summary of results based on the provided context, followed by a list of sources with their Econbiz IDs, titles, authors, years, and scores. The sources are ranked by score, with the highest score being 0.7484653.

What is the economic effect of COVID-19 on women workers

Search

Choose an LLM model: Gemma [7b] Mistral [7b] Llama2 Llama3 [8b] **Llama3.1 [8b]** Neural-Chat

Years of publications: 1500 - 2024

Based on the provided context, it appears that COVID-19 has had a significant impact on women workers in various ways. From the [10012270087](#), we can see that:

- Women's work, housework, and childcare have been affected by COVID-19.
- Most of the additional workload associated with COVID-19 falls on women.
- Childcare activities are more equally shared within couples than housework activities.
- Changes to the amount of housework done by women during the emergency do not seem to depend on their partners' working arrangements.

From the source [10012269960](#), we can see that:

- COVID-19 has increased unemployment rates and decreased labor force participation among younger workers, non-white, not married, and less-educated workers.
- Women are likely to be disproportionately affected by these changes.

Overall, it appears that COVID-19 has had a significant economic impact on women workers, including increased workload, reduced employment opportunities, and unequal distribution of household responsibilities.

Sources: Regenerate

Econbiz ID: [10012270087](#)

Title: Women's Work, Housework and Childcare, before and during COVID-19

Authors: Def Bocca, Daniela; Oggero, Noemi; Profeta, Paola; Rossi, Mania Cristina

Year: 2020

Score: 0.7484653

Econbiz ID: [10012269960](#)

Title: COVID-19, Stay-At-Home Orders and Employment: Evidence from CPS Data

Authors: Béland, Louis-Philippe; Brodeur, Abel; Wright, Taylor

Year: 2020

Score: 0.69116783

Econbiz ID: [10012202735](#)

Title: The Short-Term Economic Consequences of COVID-19: Exposure to Disease, Remote Work and Government Response

Authors: Béland, Louis-Philippe; Brodeur, Abel; Wright, Taylor

Year: 2020

Score: 0.6899104

...drawbacks of Baseline RAG

Context Understanding

- Struggles with nuanced query intent and subtle context differences.
- Ex: *"How do I treat apple tree pests in spring?"*

Scalability and Performance

- Latency increases with data scale—high storage requirements for embeddings.

Relevance and Noise

- Returns semantically similar but irrelevant results, especially if the input query is vague.

Complex Query Handling

- Struggles with multi-hop reasoning (only top-n). Fails to resolve ambiguous queries.
- Ex: *"What are the trade-offs of using solar panels in cloudy regions?"*

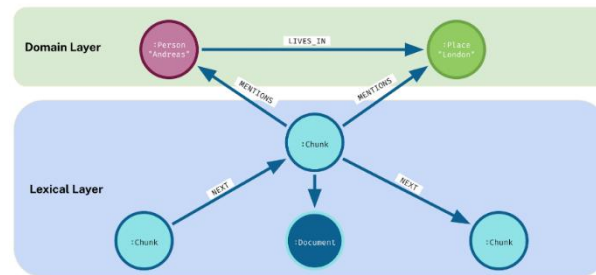
Ranking and Post-Processing

- Lacks robust ranking for *quality, recency, or user preferences*. Generative synthesis struggles with noisy results.
- Ex: *"What are the latest advancements in AI for healthcare in 2024?"*

...

RAG with Knowledge Graphs

- Explicit Representation of Relationships
- Contextual Relevance Through Graph Traversal
- Enhanced Transparency
- Multi-hop Reasoning

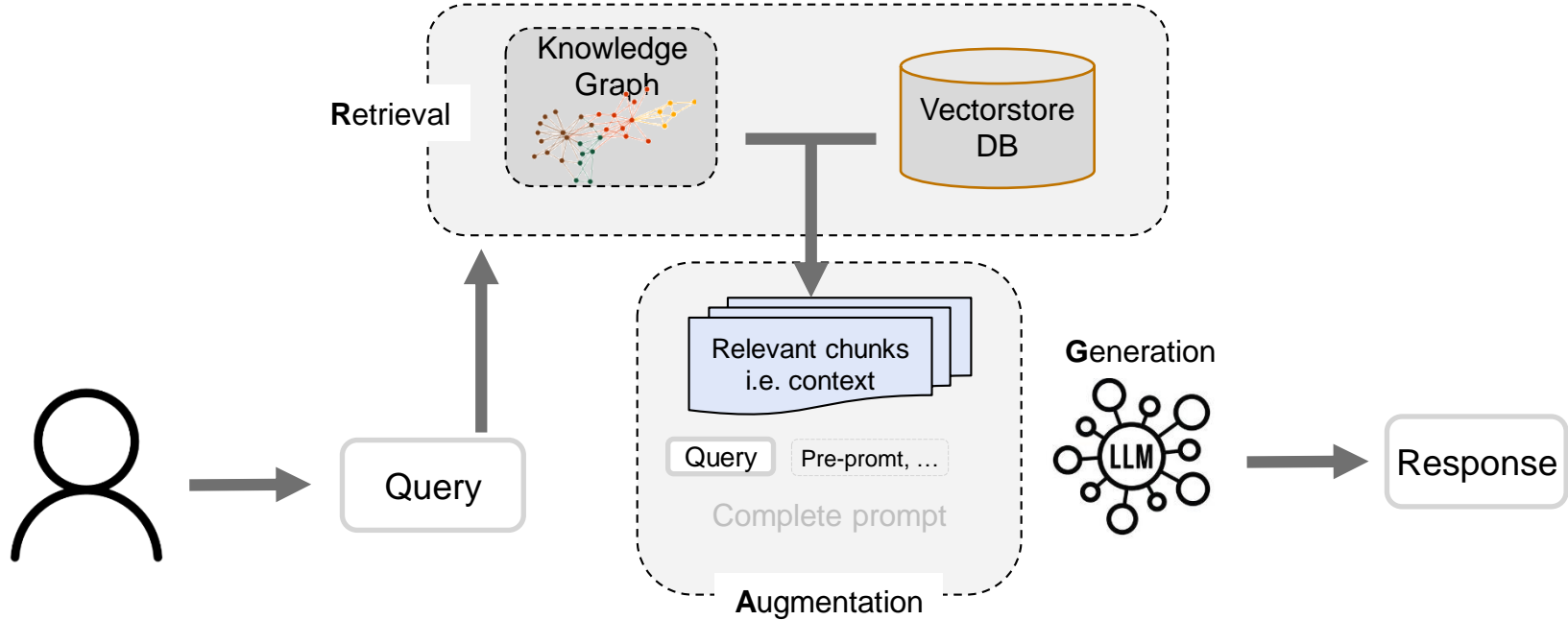


<https://neo4j.com/blog/graphrag-manifesto/>

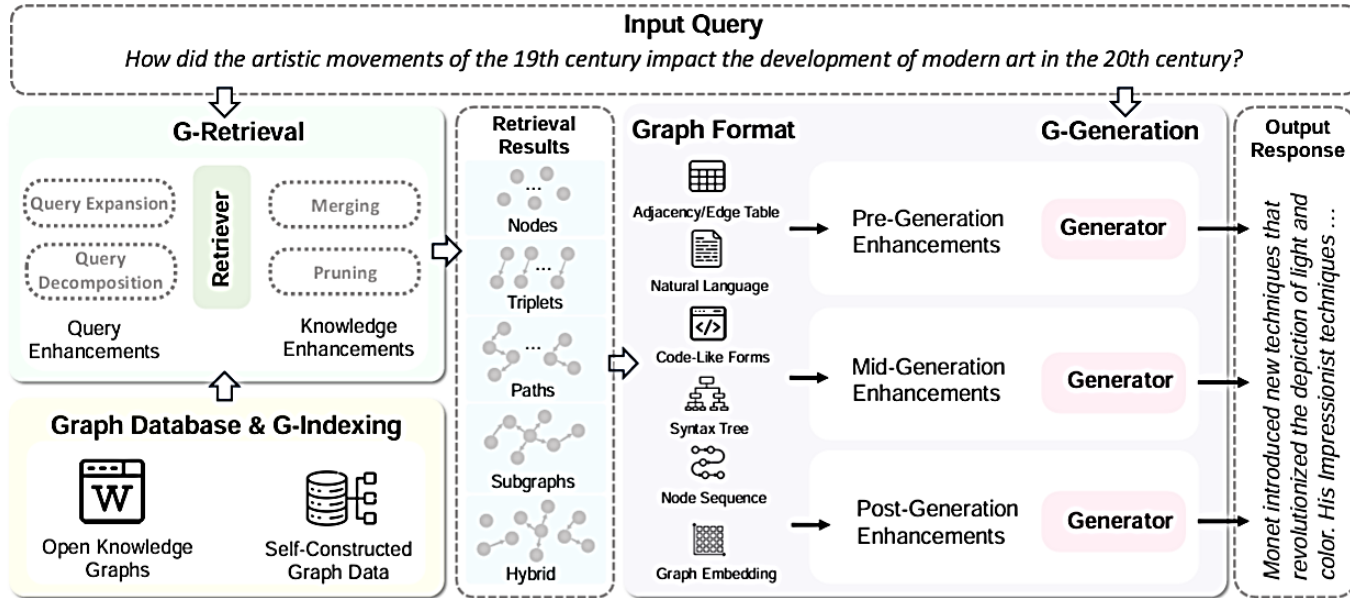
Creating / Existing KG

GraphRAG (Microsoft)*: Automatically generated KGs

KG in RAG



Example

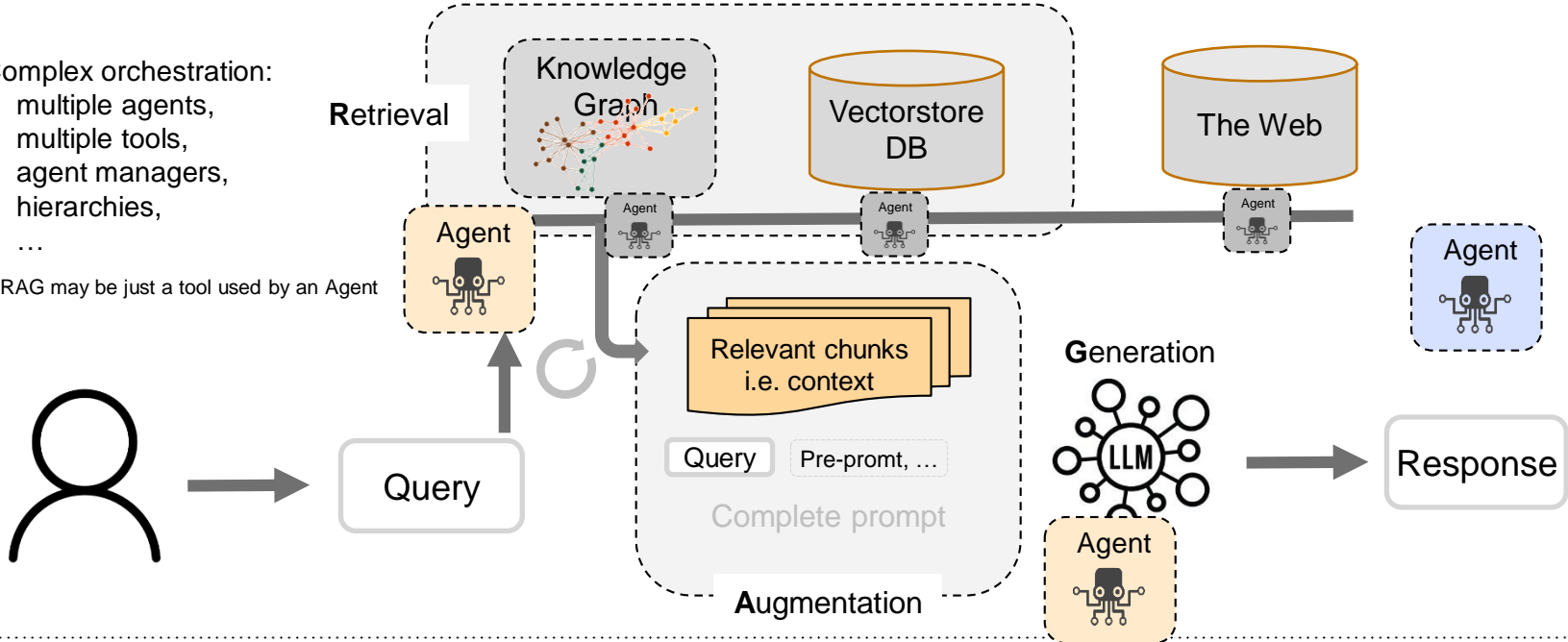


Agents in RAG Pipeline (Agentic Reasoning)

Complex orchestration:

- multiple agents,
- multiple tools,
- agent managers,
- hierarchies,
- ...

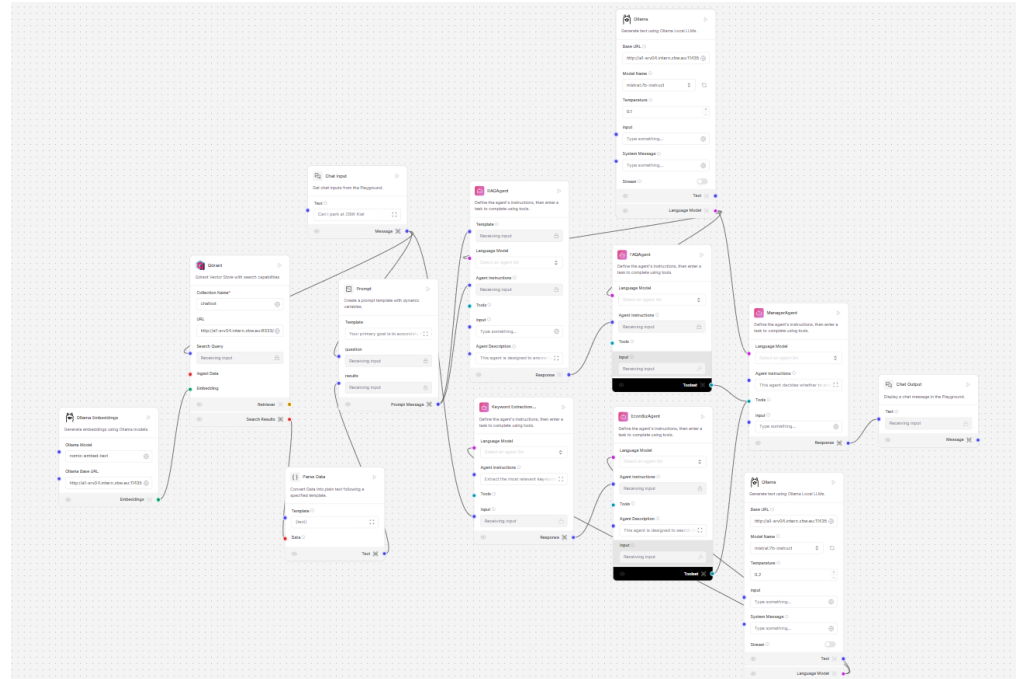
e.g. RAG may be just a tool used by an Agent



An Example of RAG Implementation Using Agents with LangFlow

This implementation leverages the following components:


- **Ollama** (local setup)
- **Ollama Embeddings**
- **Qdrant Vector Database**



Example outcome


 **User**
Can I print at ZBW Kiel

using only the
RAG Agent

 **Agent**

 **Finished** ✓ 8.6s

Based on the information provided, it appears that you can print and scan documents at both the ZBW Kiel


 **User**
I am interested in the public debt in Germany around 2024


using EconBiz and
Web Search Agents

 **Agent**

 **Finished** ✓ 8.5s

Keywords: "public debt", "Germany", "2024"
Search URL: <https://www.econbiz.de/Search/Results?lookfor=public+debt+germany+2024>

 **Agent**

 **Finished** ✓ 5.3s

To answer your question about public debt in Germany around 2024, I would first need to find and analyze relevant data from reliable sources such as the German Federal Statistical Office (Destatis) or the

Thank you!

If you have questions or comments, please contact
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